

INTERNATIONAL BACCALAUREATE

BIOLOGY

Higher Level

Wednesday 8 May 1991 (afternoon)

Paper 1

1 hour

INSTRUCTIONS

There are 40 questions in this paper and you should attempt them all.

For each question there are 4 suggested answers. Read each question carefully. When you have selected the answer you consider to be the best, indicate your choice on the answer sheet provided. Choose only one answer for each question.

Your score for this paper will depend on the total number of correct answers given.

ALL ANSWERS MUST BE GIVEN ON THE SPECIAL ANSWER SHEET

1. Phospholipids are important constituents of
 - A. cell membranes.
 - B. ribosomes.
 - C. enzymes.
 - D. minerals.

2. Cellulose is a polysaccharide found in
 - A. animal cell membranes.
 - B. plant cell membranes.
 - C. animal cell walls.
 - D. plant cell walls.

3. The links —NH—CO— are formed in
 - A. polysaccharides.
 - B. polypeptides.
 - C. polynucleotides.
 - D. polyphosphates.

4. Enzymes are
 - A. nucleic acids.
 - B. carbohydrates.
 - C. proteins.
 - D. nitrogen bases.

5. ATP is a nucleotide
 - A. low in energy.
 - B. without adenine.
 - C. with ribose.
 - D. without phosphate.

6. The complementary nitrogen base of guanine in DNA molecules is
 - A. uracil.
 - B. adenine.
 - C. thymine.
 - D. cytosine.

7. Chloroplasts and mitochondria have in common the ability to
 - A. synthesise ATP.
 - B. produce CO_2 .
 - C. be activated by light.
 - D. produce O_2 .

8. Glucose is synthesised by
 - A. mitochondria.
 - B. ribosomes.
 - C. chloroplasts.
 - D. lysosomes.

9. Both prokaryotic and eukaryotic cells have
 - A. mitochondria.
 - B. ribosomes.
 - C. digestive vacuoles.
 - D. Golgi apparatus.

10. Phagocytosis enables animal cells to carry out
 - A. respiration.
 - B. excretion.
 - C. division.
 - D. nutrition.

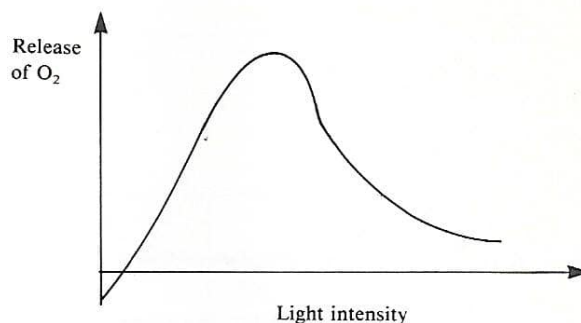
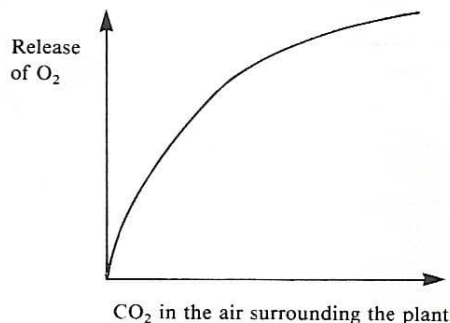
11. Microtubules are constituents of
 - A. cilia.
 - B. microfilaments.
 - C. cell membranes.
 - D. the endoplasmic reticulum.
12. Lysosomes contain enzymes which permit cell
 - A. respiration.
 - B. digestion.
 - C. synthesis.
 - D. movement.
13. During mitosis the nuclear envelope dissolves at the end of
 - A. interphase.
 - B. prophase.
 - C. anaphase.
 - D. telophase.
14. Translation is the process in which ribosomes synthesise
 - A. messenger RNA (m-RNA).
 - B. DNA.
 - C. another ribosome.
 - D. a polypeptide.
15. An anticodon consists of
 - A. three amino acids.
 - B. part of the ribosome.
 - C. three nucleotides.
 - D. part of the messenger RNA (m-RNA).

16. Which one of the following represents a correct sequence of taxonomic groups?
- A. Class, order, species, family, genus
 - B. Species, genus, family, order, class
 - C. Species, order, class, genus, family
 - D. Family, order, species, class, genus
17. Protists are
- A. unicellular eukaryotes.
 - B. multicellular eukaryotes.
 - C. unicellular prokaryotes.
 - D. photosynthetic prokaryotes.
18. Crustaceans and Insects both belong to one of the following phyla. Which one?
- A. Mollusca
 - B. Cordata
 - C. Arthropoda
 - D. Annelida
19. Oxygen taken in by a mammal follows one of the following routes. Which one?
- A. Bronchioles, alveolae, capillaries, cells, mitochondria
 - B. Trachea, alveolae, capillaries, pulmonary artery, left atrium
 - C. Trachea, bronchii, capillaries, pulmonary vein, right atrium
 - D. Trachea, bronchii, alveolae, capillaries, right ventricle
20. What do Pteridophytes and Spermatophytes have in common?
- A. The production of flowers.
 - B. The production of seeds.
 - C. They are vascular plants.
 - D. They contain little chlorophyll.

21. A biologist observing some leaves, notes that the stomata are all wide open. He may conclude that in this plant
- A. both water absorption and transpiration are high.
 - B. there is low water absorption and transpiration.
 - C. there is low absorption but high transpiration.
 - D. there is high water absorption but low transpiration.
22. Saprophytes and parasites both feed on
- A. dead animals.
 - B. living animals.
 - C. dead plants.
 - D. organic matter.
23. The starch of the bread we eat is digested by certain enzymes (I) produced by certain organs (II) which act in certain parts of the digestive tract (III). What are the correct names of I, II and III?

	I	II	III
A.	maltase	salivary glands and intestine	mouth and intestine
B.	amylases	salivary glands and pancreas	mouth and intestine
C.	lipases	gall bladder	duodenum
D.	glucosides	pancreas and small intestine	small intestine

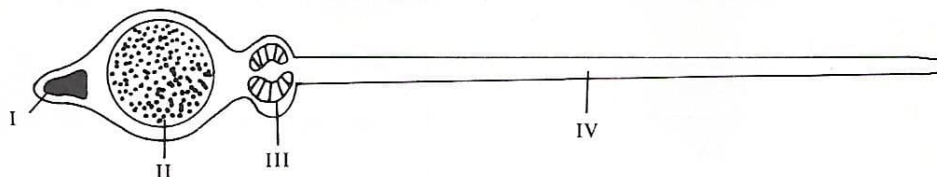
24. A biologist obtained the following graphs as a result of experiments carried out on the photosynthesis of a plant normally living in the shade.



- These results show that the rate of the photosynthesis is
- not dependent on light intensity nor on the concentration of CO₂ in the air.
 - directly proportional to light intensity and to CO₂ concentration in the air.
 - dependent on light intensity and on CO₂ concentration in the air.
 - directly proportional to CO₂ concentration and indirectly proportional to light intensity.
25. In the human nervous system the direction of nerve impulses is determined by the
- axons.
 - brain.
 - synaptic membranes.
 - hypothalamus.
26. The pituitary gland in Mammals secretes the following hormones:
- antidiuretic hormone, adrenalin, insulin, corticotropin (ACTH), thyroxine.
 - growth hormone, adrenalin, glucagon, thyroid stimulating hormone (TSH), thyroxine.
 - antidiuretic hormone, growth hormone, gonadotropic hormone (FSH + LH), corticotropin (ACTH), thyroid stimulating hormone (TSH).
 - growth hormone, gonadotropic hormone (FSH + LH), oestrogens, testosterone, progesterone.

27. B-lymphocytes synthesise and secrete
- A. antibodies.
 - B. antibiotics.
 - C. enzymes.
 - D. vaccines.
28. A trisomic mutant cell always has
- A. an even number of chromosomes.
 - B. an odd number of chromosomes.
 - C. three times the normal number of chromosomes.
 - D. one third of the normal number of chromosomes.
29. The first division of meiosis results in
- A. a primary oocyte and a secondary oocyte.
 - B. two secondary oocytes.
 - C. an ovum and a polar body.
 - D. a secondary oocyte and a polar body.
30. Spermatozoa derive from spermatids by
- A. reduction division.
 - B. mitosis.
 - C. differentiation.
 - D. growth.

31. From the diagram of a spermatozoan given below, identify the structures I, II, III and IV in the following table.



	I	II	III	IV
A.	mitochondria	nucleus	lysosome	flagellum
B.	acrosome	nucleus	mitochondria	flagellum
C.	nucleus	lysosome	acrosome	microtubule
D.	lysosome	mitochondria	nucleus	microtubule

32. During fertilisation
- the whole spermatozoon enters the ovum cytoplasm.
 - the nucleus of the spermatozoon enters the ovum cytoplasm.
 - the nucleus and the tail of the spermatozoon enter the ovum cytoplasm.
 - the acrosome and the nucleus of the spermatozoon enter the ovum cytoplasm.
33. After 24 hours at 20 °C the fertilised ovum of the *Xenopus* (an African toad) divides into 32 000 blastomeres. It may therefore be said that the nuclear DNA content of the embryo obtained is greater than the nuclear DNA content of the zygote by
- 16 000 times.
 - 32 000 times.
 - 64 000 times.
 - an unspecified number of times between 16 000 and 32 000.
34. The foetal placenta in Mammals is derived from the
- whole blastula.
 - whole blastocyst.
 - embryonic bud.
 - trophectoderm.

35. In humans the A, B, O blood system is coded by three alleles: I_A , I_B and i . I_A and I_B are codominant and both are dominant over the third allele i . The mother of a family is group A, the father is group B and the son is group O. Which are the correct genotypes in the table below?

	Mother	Father	Son
A.	$I_A I_A$	$I_B i$	$I_A I_B$
B.	$I_A i$	$I_B i$	ii
C.	$I_A i$	$I_B I_B$	$I_B i$
D.	ii	$I_A I_B$	$I_A i$

36. A second child, a daughter, is born to the parents of the family described in question 35. What is the probability that the daughter is of the same group O as her brother?
- A. 0 %
- B. 25 %
- C. 50 %
- D. 100 %
37. Charles Darwin's theory of evolution (1859) is based primarily on the concepts of
- A. random variation of individuals and selection of those most suited to the environment.
- B. environmentally directed variation which immediately suits the environment.
- C. genetic recombinations.
- D. growth and hybridisation of populations.
38. While studying the ecology of a species of spider, a biologist analysed factors relating to the soil, micro-climate, nutritional preferences, reproductive habits and all competing organisms. Which ecological aspect was he studying?
- A. The environment
- B. An ecosystem
- C. A niche
- D. A population

39. The net energy in an ecosystem is increased when
- A. plants are actively photosynthesizing.
 - B. when tissues of herbivores are converted into tissues of carnivores.
 - C. there is a loss of nitrates in the soil.
 - D. denitrifying bacteria are present.
40. While studying field voles, an ecologist caught 500 and ringed a foot of each before releasing them. Every day for the next two weeks he examined the waste material found in the nests of their predators. He collected a total of 300 field vole skulls and 15 rings. How many field voles were probably in the area examined?
- A. 1000
 - B. 5000
 - C. 10 000
 - D. 50 000
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